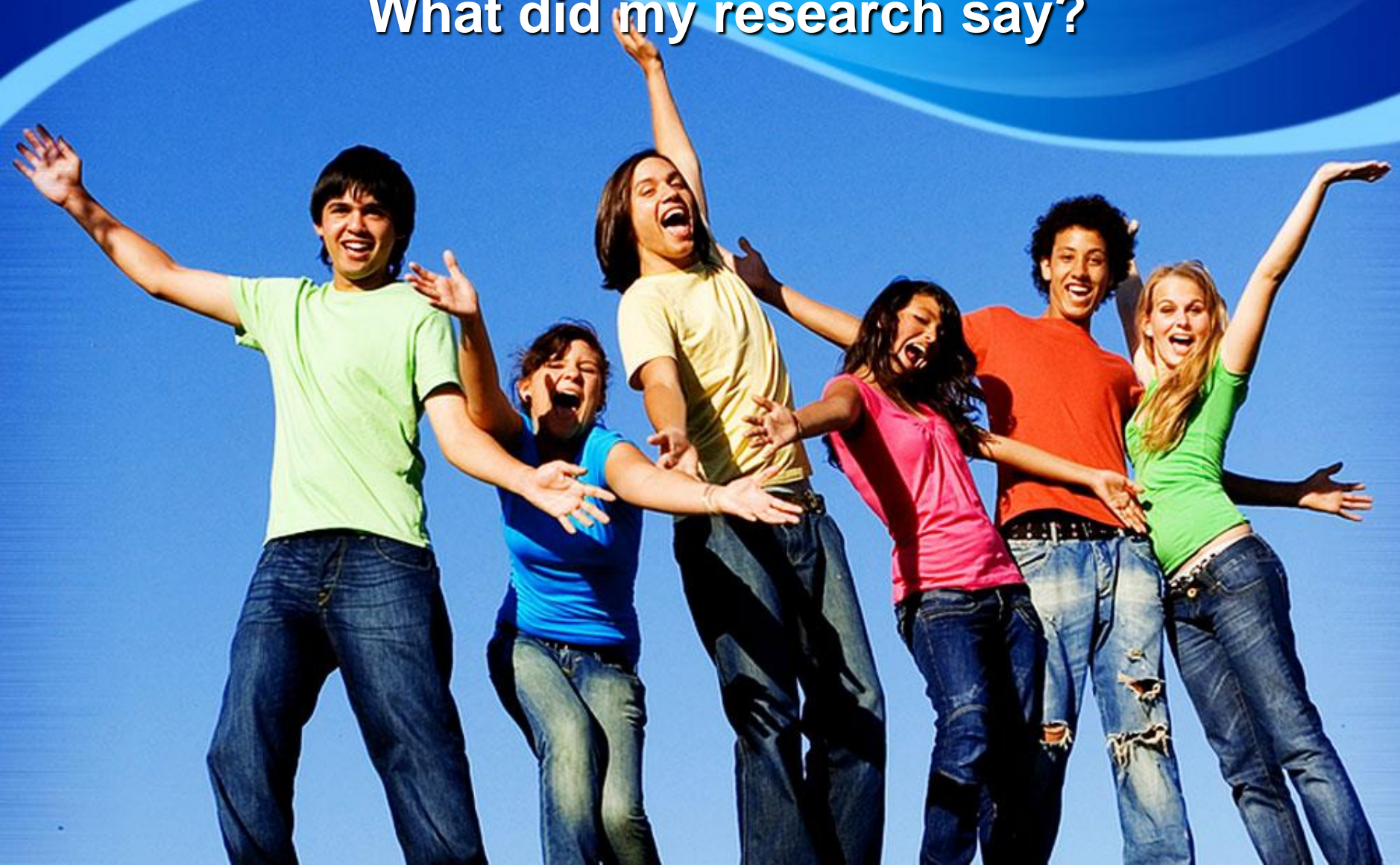


Effective Practices in Grade 9 Applied Mathematics

What did my research say?



BACKGROUND





Ontario is revising its
Grade 9 applied
math curriculum
after nearly three-
quarters of students
failed to meet
provincial standards
The Canadian Press, Nov. 25, 2004

"Two-thirds of the applied math students
fell short of the provincial benchmark, while
three-quarters of academic math students
met or surpassed it."

The Globe and Mail, August 27, 2009

"Improvement has also stalled for students
taking Grade 9 applied math, meant for those
heading directly to work or college after
graduation."

The Toronto Sun, May 8, 2011

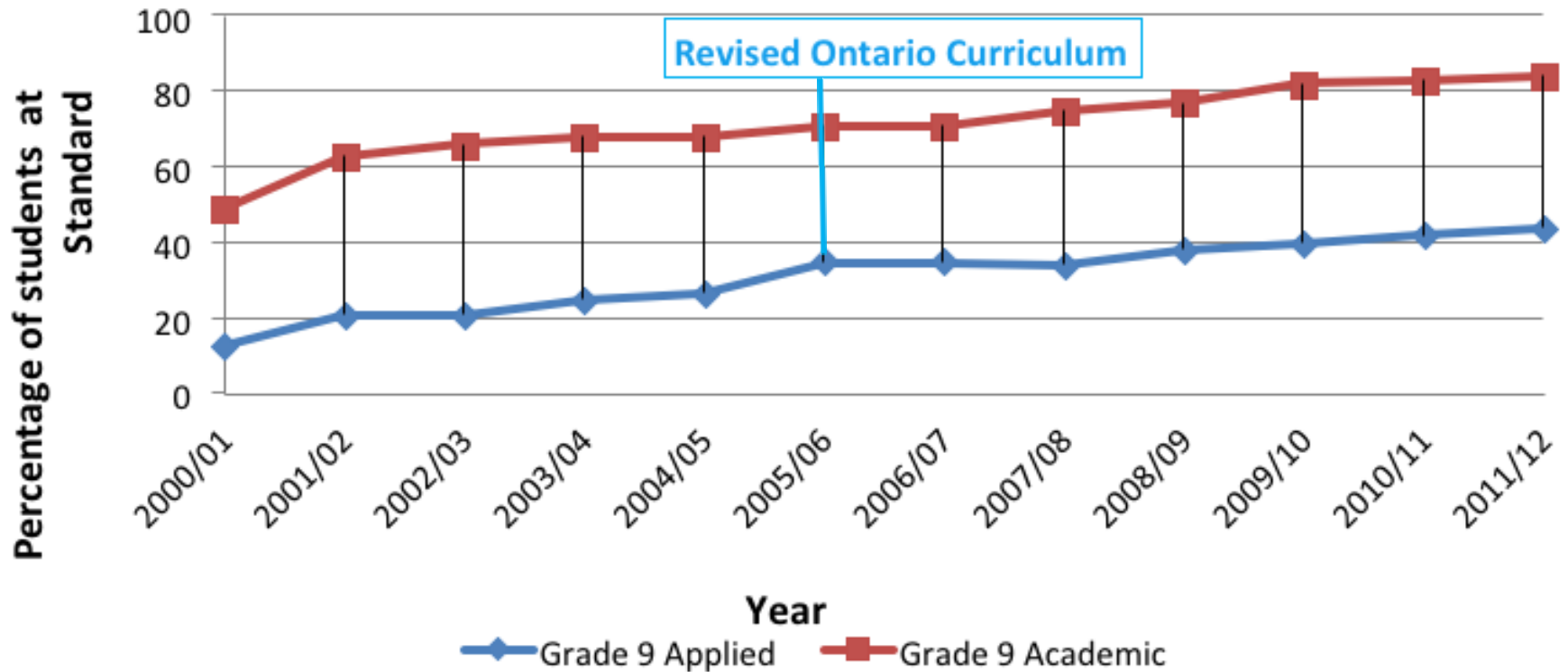
"Despite improvement over the years,
more than half of Grade 9 applied math
students still did not reach the provincial
standard in the 2013 EQAO test."

National Post, February 19, 2014

"...still more than half of Ontario Grade 9 students who take math at the
'applied,' more hands-on level have failed to earn a B, the target set by
Queen's Park."

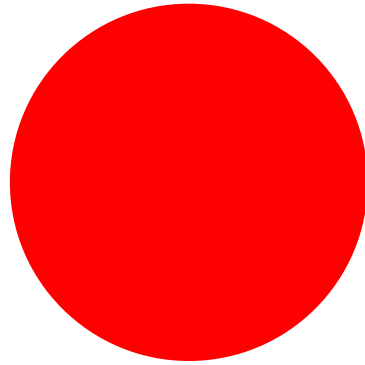
The Toronto Star, Feb 12, 2012

Provincial EQAO Trend Data: Grade 9 Mathematics



- **So what?**

Turn and Talk



Significance of achieving standard

EQAO maintains that parents of students achieving at Level 3 and 4 “can be confident that their children will be prepared for work in subsequent grades or courses”

(EQAO, 2010b, p. 1)



Impact of failure

“According to the Ministry of Ed, 41.3% of students who started in Grade 9 Applied Mathematics had not earned 16 credits by the end of Grade 10, taking them off course from graduating on time. This compares to a much smaller 14.4% of students who did not earn 16 credits by age 16 that started in Grade 9 Academic Mathematics”

People for Education, 2013



Approximately 40 000 students enrolled in college mathematics courses in Fall 2012

- 25.8% of students took a remedial mathematics course
- This number is up nearly 30% from five years ago

People for Education, 2013

“50% of those students who had taken Grades 9 and 10 Applied Mathematics were at risk in college.”

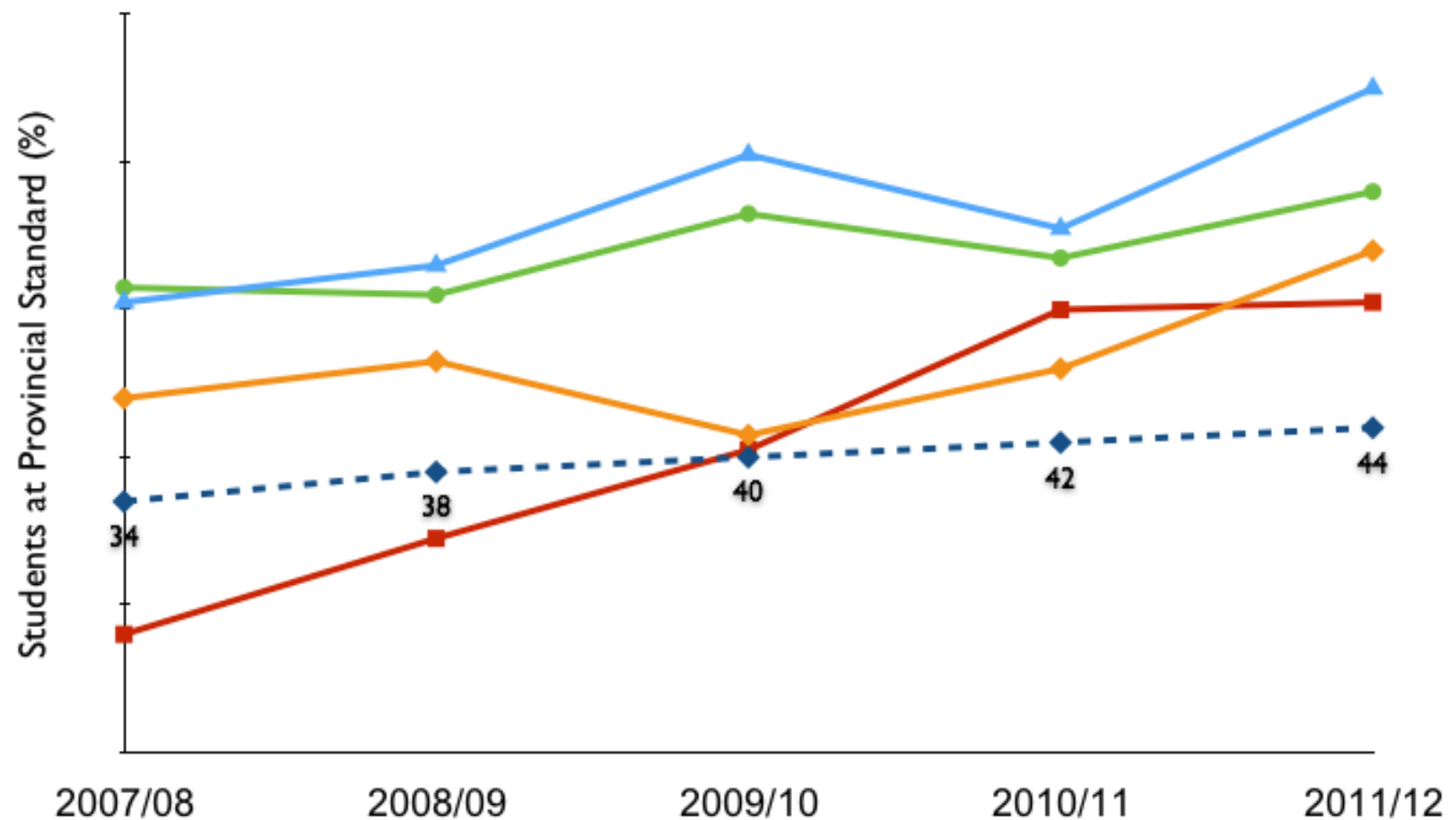
College Math Project, 2008

“Students coming into college with a D in applied math either fail or drop out of college in their first year.”

College Math Project, 2011

- Province Applied
- School A Applied
- School B Applied
- School C Applied
- School D Applied

EQAO Grade 9 Mathematics results over time



Character study

- What's the first word that comes to mind when you think about students in applied mathematics classrooms?
- If you must use two words or more words, please join them with an underscore “_”





Your poll will show here

1


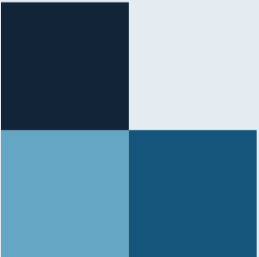
Install the app from
pollev.com/app

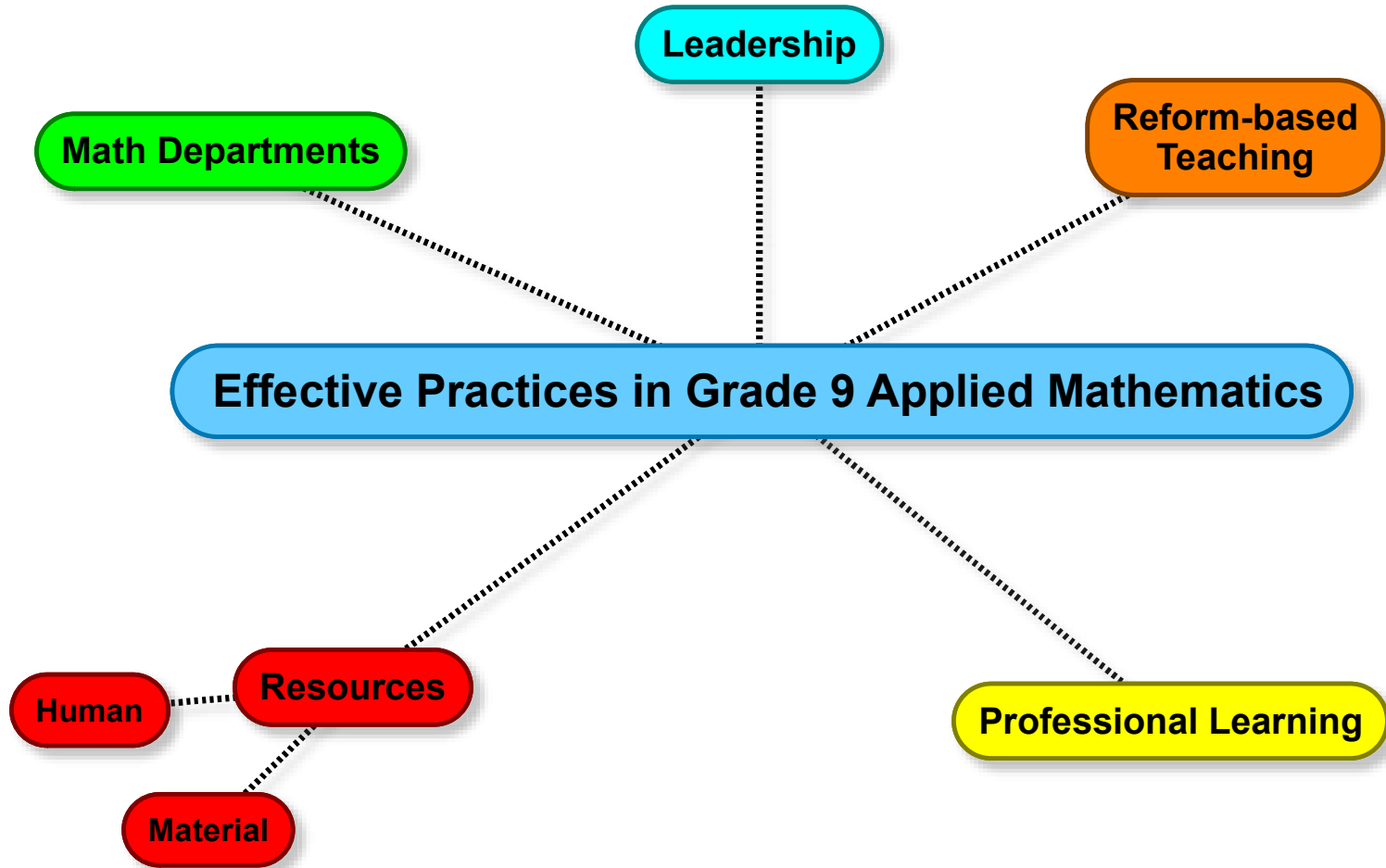
2

Make sure you are in
Slide Show mode

Still not working? Get help at pollev.com/app/help
or

[Open poll in your web browser](#)





Reform-based teaching

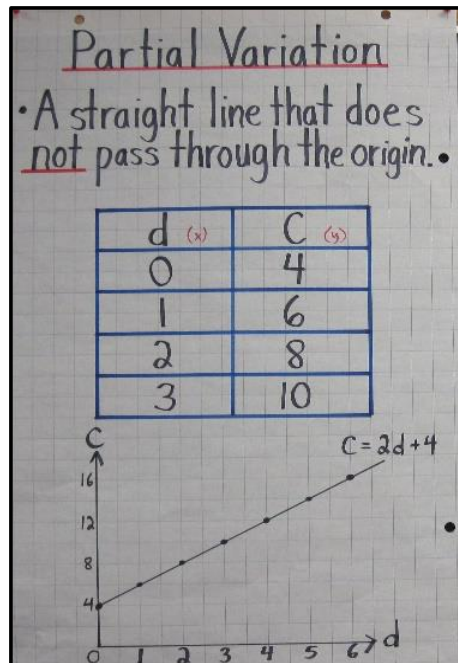
- Dimension 2: Learning Environment
- Dimension 4: Student Learning Tasks
- Dimension 5: Constructing Knowledge
- Dimension 7: Use of Manipulative and Technology
- Dimension 8: Students' Mathematical Communication
- Dimension 9: Assessment for Learning
- Dimension 10: Fostering Productive Dispositions

(McDougall, 2004)



Learning environment

- Collaborative learning spaces



Determine:

Use mathematics to find a solution to the problem.

List:

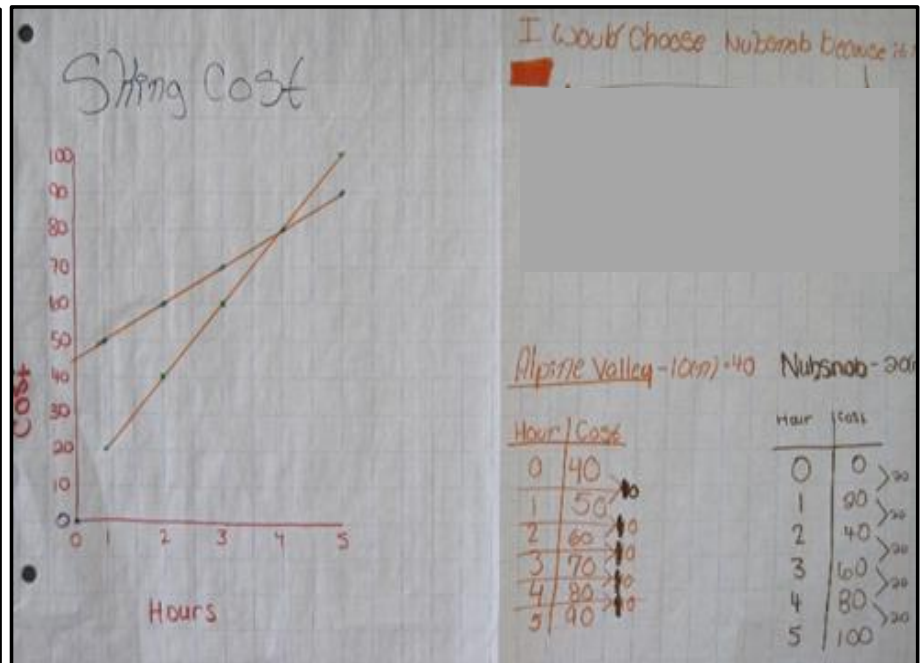
Use point form.

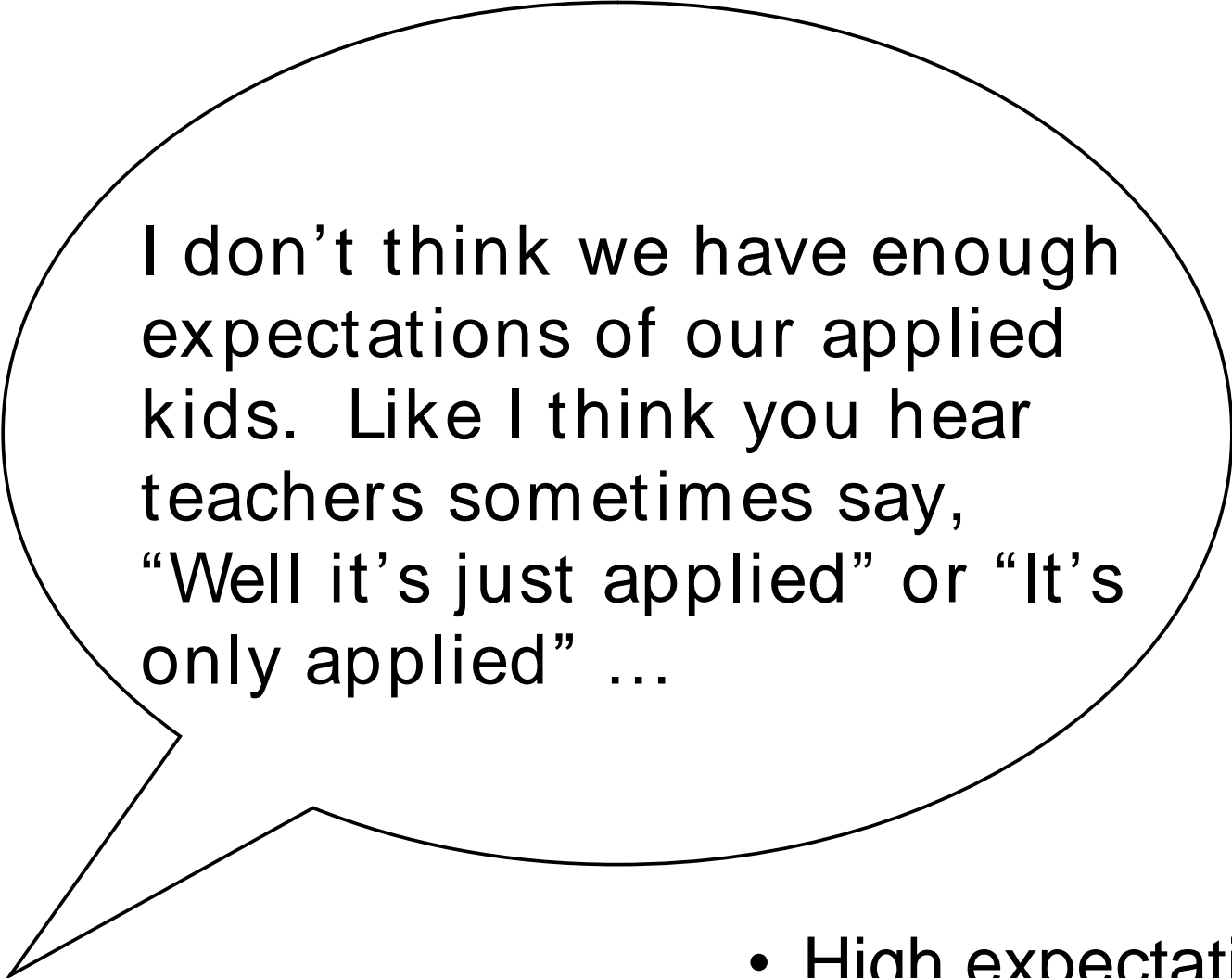
Explain:

Use words and symbols to make your solution clear.

Justify:

Give reasons and evidence to show your answer is correct.





I don't think we have enough expectations of our applied kids. Like I think you hear teachers sometimes say, "Well it's just applied" or "It's only applied" ...

- High expectations

Wednesday, June 5, 2013

- ① Skill builder
- ② Finish triangles from yesterday
- ③ A competition
- ④ BB.
- ⑤ Investigation
- ⑥ follow up & examples
- ⑦ Ticket at the door

Student learning tasks

Cognitive Skill	Associated Verbs
Knowing	Recall Recognize Classify/Order Compute Retrieve Measure
Applying	Determine Represent/Model Implement
Reasoning	Analyze Integrate/Synthesize Evaluate Draw Conclusions Generalize Justify

If the job took 12 hours, which company would you choose? Explain your answer, (ObsA)

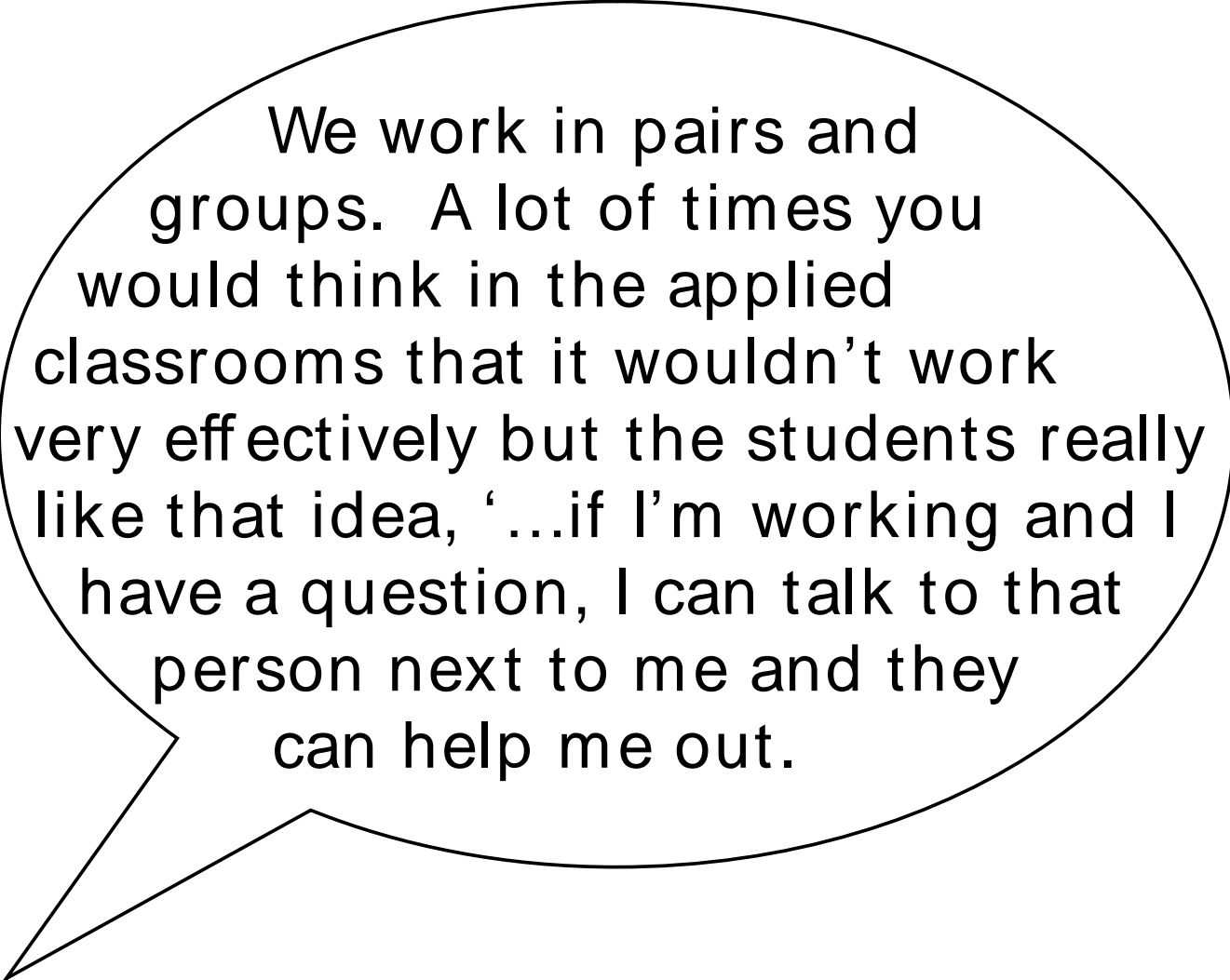
Can a triangle have two 90 degree angles? Explain your thinking, (ObsB)

Describe the relationship between triangles and the number of sides in a polygon, (ObsC)

Which company should the yearbook club select to print this year's yearbook? Justify your choice. (ObsD)

Constructing knowledge





We work in pairs and groups. A lot of times you would think in the applied classrooms that it wouldn't work very effectively but the students really like that idea, '...if I'm working and I have a question, I can talk to that person next to me and they can help me out.'

Use of manipulatives and technology



- Open access to manipulatives, calculators, pencils
 - Thinking tools
- Smartboards in every room
- Individual whiteboards

Student's mathematical communication

- Math Talk is expected
- Partner and Group Work
 - Teacher engages in observations and conversations

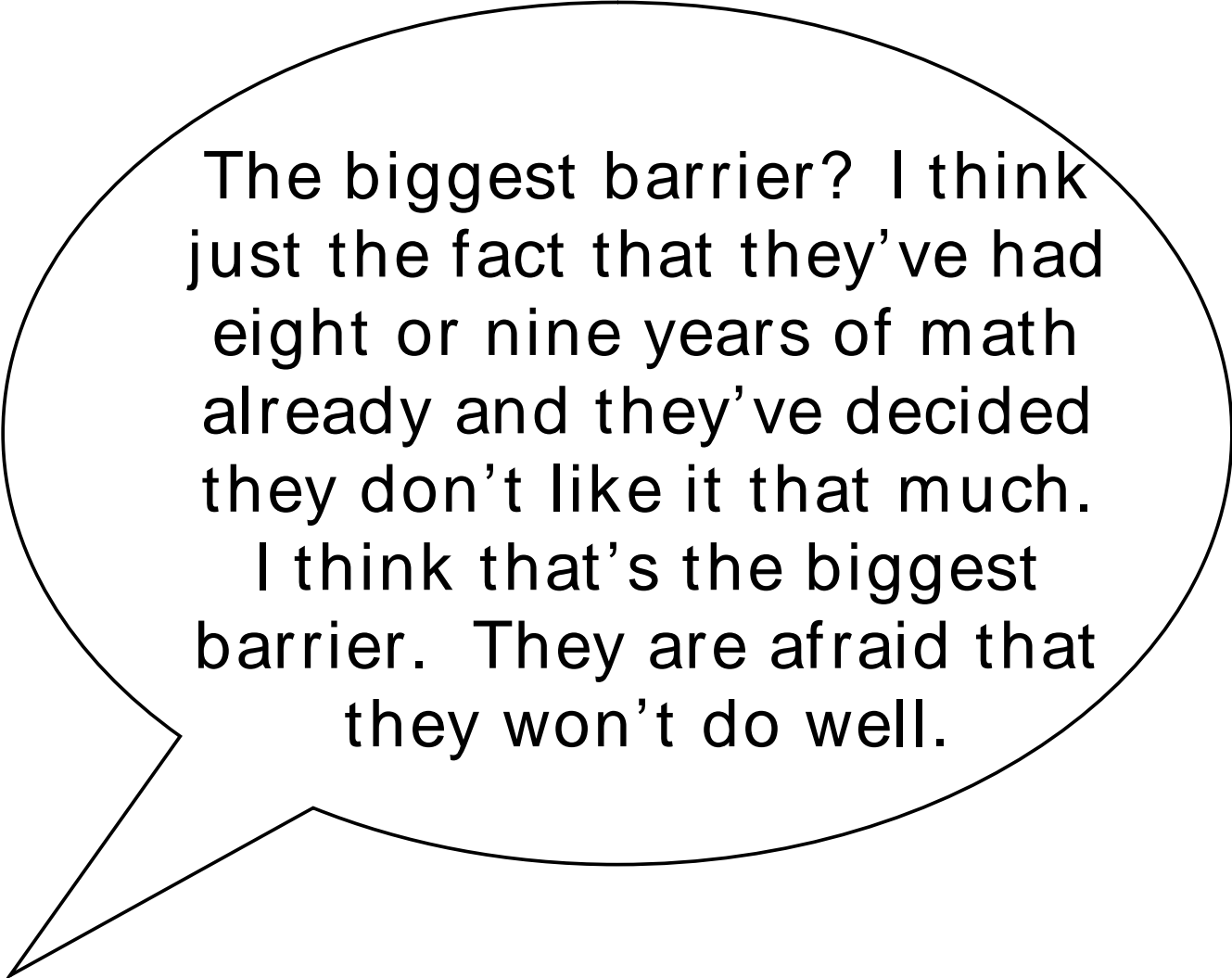
“I didn’t have to wait until they had written something down and handed it to me to know what they were thinking.” (FGB: Gilbert)

Assessment for learning

- Close monitoring of every student
- Strategic peer groupings
- Observations and conversations
- Oral and descriptive feedback
- Integration of EQAO questions and anchor booklets



Fostering productive dispositions



The biggest barrier? I think just the fact that they've had eight or nine years of math already and they've decided they don't like it that much.

I think that's the biggest barrier. They are afraid that they won't do well.

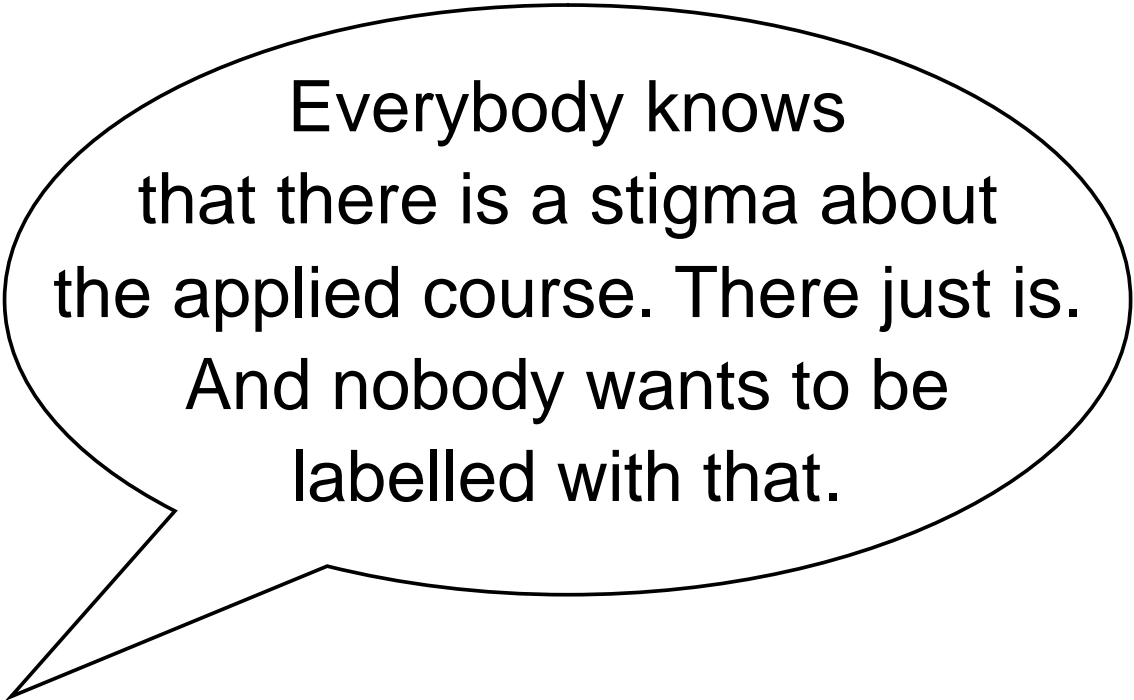
- Build confidence, success, and comfort with math
 - Make connections to prior learning
- Share your love of math (the wow factor)
- Applaud and celebrate diversity in thinking
 - Be open to a variety of ways to solve problems
- Battle the applied stereotype



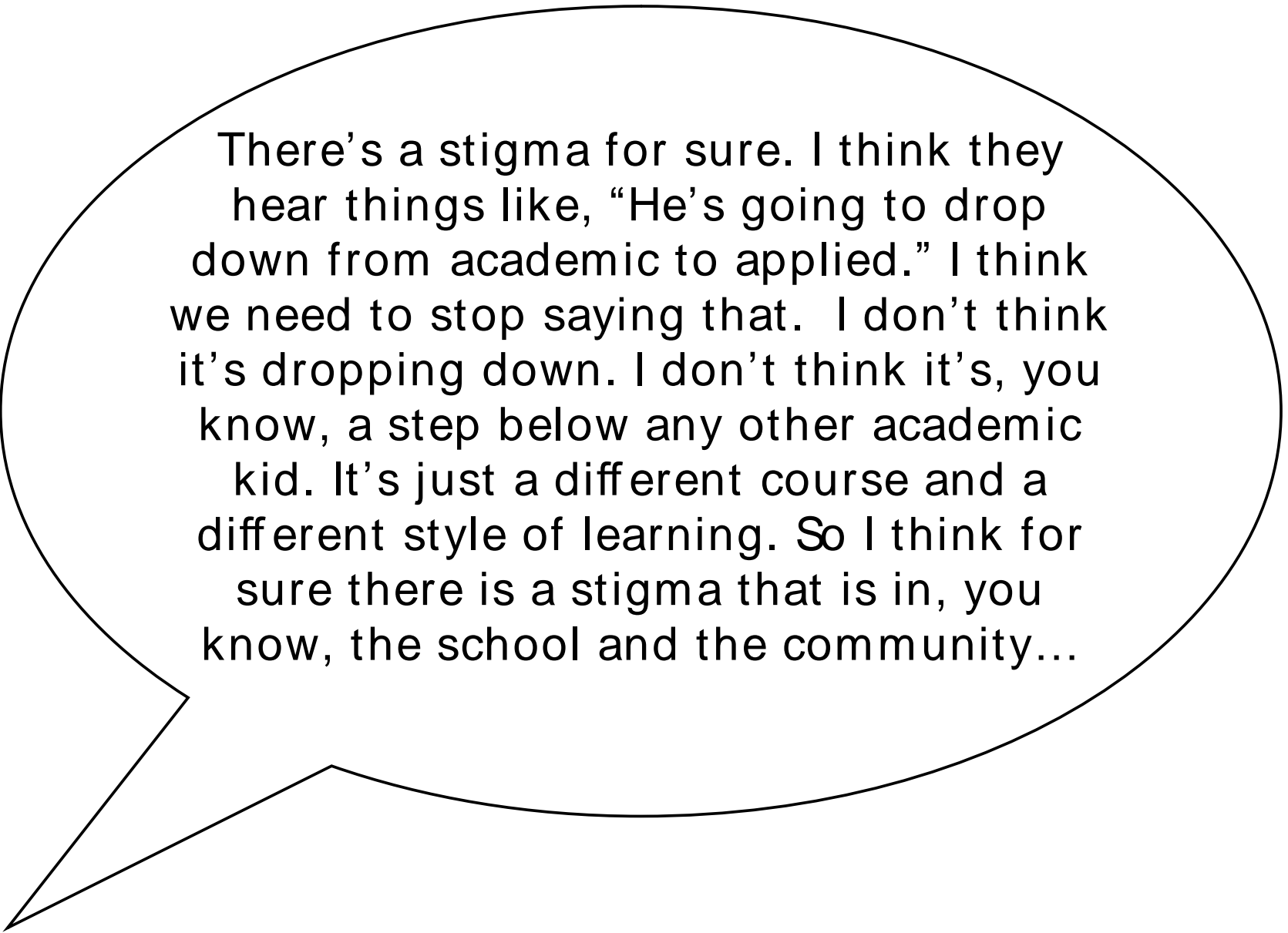
Sweathog Persona



The “Applied” Stereotype



Everybody knows
that there is a stigma about
the applied course. There just is.
And nobody wants to be
labelled with that.



There's a stigma for sure. I think they hear things like, "He's going to drop down from academic to applied." I think we need to stop saying that. I don't think it's dropping down. I don't think it's, you know, a step below any other academic kid. It's just a different course and a different style of learning. So I think for sure there is a stigma that is in, you know, the school and the community...



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"Do you want to hit better shots on the golf course? Score higher on the SAT? Get less nervous before speaking in public? In this marvelous book, Sian Beilock will tell you how as she reveals the mental secrets to performing under pressure."

—JONAH LEHRER, author of *PROUST WAS A NEUROSCIENTIST*

Choke

WHAT THE SECRETS OF THE BRAIN
REVEAL ABOUT GETTING IT RIGHT
WHEN YOU HAVE TO

SIAN BEILOCK

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Resources (material)

- Used a variety of resources
 - Favoured active, hand-on activities
 - TIPS4RM
- Interactive and visual technologies



Resources (human)

- Core team of 9 Applied Teachers, including Math Head
 - Innovative, willing to try new things
 - Wanted to teach the course
- Comfortable with the math
- Two-thirds had experience in Grade 7 and 8



Leadership

- Three of four schools had an administrator with a math background
- Shared leadership model
- Math Department Head mentors new teachers to Grade 9 Applied Math
- Value EQAO
 - It is celebrated



Math Departments

- Collaborative and professional supportive and enriching community
- Value EQAO results
It counts!
- Good Grade 9 results are a proxy to better performance in more senior courses



Professional Learning

- Focused on instructional strategies (vs. mathematics content)
- Fostered understanding of the curriculum, including grade 7 and 8
- Collaborative in nature, teacher directed
- PD focused on rich and open tasks serves as springboard to other reform-based strategies





Research meets practice

- OAME Grade 9 Applied Project
 - Provides a collaborative space for educators
 - School teams including Administrators and Department Heads
 - Focused on curriculum implementation in applied classroom settings
 - Mobilizing learning and resources



Thank you

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